
A New Species of *Gagnebina* (Leguminosae: Mimosoideae) from Madagascar

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ABSTRACT. A new species of *Gagnebina* from northern Madagascar, *G. bakoliae* Luckow & Du Puy, is described and illustrated. The new species is most similar to *G. bernieriana*, and shares with it features such as resting buds, dehiscent fruits, and pollen in 16-celled polyads. *Gagnebina bakoliae* differs from *G. bernieriana* in having the pinnae decrescent both apically and basally, the petiole densely tomentose adaxially but glabrous abaxially, and pods somewhat larger and darker in color.

Recent fieldwork in Madagascar by the authors has led to the discovery of a new species of *Gagnebina*. This genus is known from some six species, all of which are endemic to Madagascar and the nearby Comoros and Mascarene Islands. Traditionally circumscribed by indehiscent, winged fruits, *Gagnebina* was expanded by Lewis and Guinet (1986) to include any species with linear anthers. This involved the reassignment of several species that had previously been included in the closely related genus *Dichrostachys*. Both genera have staminodial flowers at the base of the inflorescence and centers of diversity in Madagascar. Recent cladistic analyses by the first author (Luckow, 1995) indicated that *Gagnebina* should further expand to encompass all those species with linear or subulate stipules if it was to be monophyletic. Another character correlated with stipule morphology, and mentioned by Lewis and Guinet (1986), is lack of the brachyblasts that characterize species of *Dichrostachys* and *Alantsilodendron*. In contrast, the species of *Gagnebina* discussed herein possess resting buds with perules. This may characterize the genus as a whole, although further work is needed to demonstrate that resting buds are present in all species in the genus.

Gagnebina bakoliae Luckow & Du Puy, sp. nov.

TYPE: NW Madagascar. Antsiranana: Route Nationale 6, ca. 25 km NE of Ambilobe, near village of Ambilomagadro, close to Ankarana Massif, 49°07'E, 13°01'S, 220 m, 17 Nov. 1992, G. P. Lewis, D. Du Puy & B. D. Schrire 2141 (holotype, K; isotypes, BH, P, TAN). Figure 1.

Gagnebinae bernieriana (Baillon) Luckow similis, sed petiolo et rachide dorsaliter glabris, ventraliter tomentosis, pinnis in rachide non valide accrescentibus, fructibus 10 cm usque longis et atrobadiis, et antheris ovato-sagittatis diversa.

Spindly shrub or small tree 2–5 m tall; young branches angled, pubescent on the edges with curly or spreading golden hairs; older branches terete, with smooth, mottled gray bark; brachyblasts absent, but resting buds present with 6 to 8 perulate scales, 5–6 × 1.5–2 mm, ovate, striate with raised nerves, glabrous, stramineous. Stipules dimorphic, those on the leaves formed just after the resting bud breaks oblong, 4–5 × 1.5–2 mm, acute apically, striate, stramineous, similar in color and texture to the resting bud scales, deciduous; stipules gradually becoming subulate distally on the branch, 6–9 × 0.5 mm, ± persistent, present on most flowering and fruiting branches. Leaves 6–12 cm long, the petiole, rachis, and pinnae adaxially tomentose with gray or stramineous hairs, abaxially glabrous, petiole 0.8–2 cm long, rachis (4)6–10 cm long; nectary 1.5 mm diam., sessile, crateriform, orbicular, borne between the proximal pair of pinnae, often between the terminal pair and sometimes between other pairs; pinnae (10)15 to 20(25) pairs per leaf, decrescent at both ends, 2–4 cm long, the axis usually forming a subulate point 1–2 mm beyond the insertion of the terminal pair of leaflets; leaflets 40 to 60(70) pairs per pinna, 2–3 × 0.35–0.5 mm, linear-falcate, acute, truncate-oblique basally, glabrous, sometimes ciliate, the nearly centric midvein visible on the dorsal surface. Peduncle 2–3 cm long, sparsely puberulent, in fruit becoming (2–)4–7 cm long, stout, woody; inflorescences axillary, one or, more frequently, two per node, each a congested spike of 40 to 75 flowers, 1–2 cm wide, the rachis 2.5–3 cm long, the proximal flowers sterile, the distal fertile. Bracteoles subtending each flower 1.5 mm long, carinate, linear, deciduous, ciliate, 1-nerved. Sterile flowers 7 to 20 per inflorescence, calyx shallowly cupulate, 0.5–1 mm long, constricted at the base to form a minute pedicel, the 5 lobes

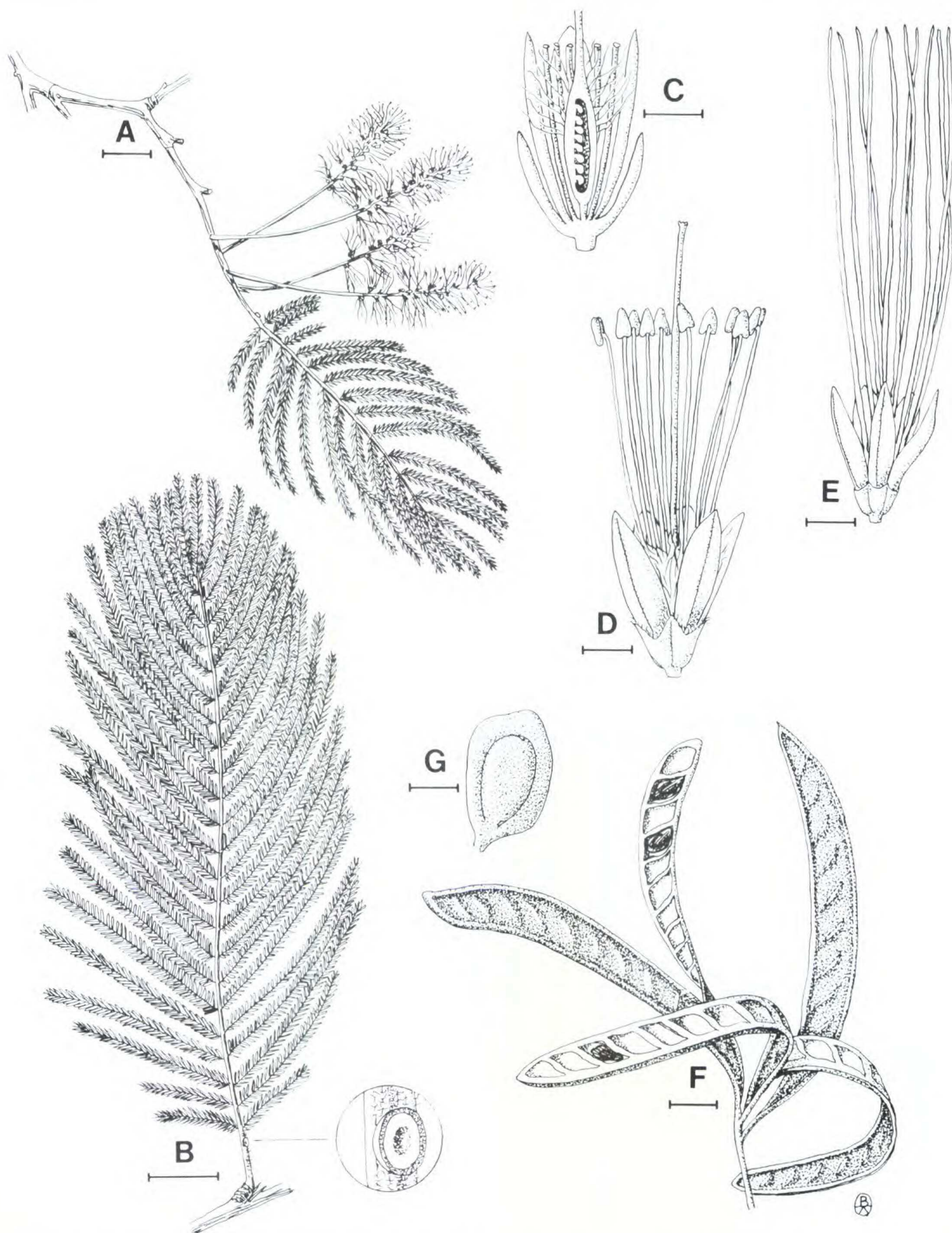


Figure 1. *Gagnebina bakoliae* Luckow & Du Puy. —A. Flowering branchlet. —B. Leaf with close-up of petiolar nectary. —C. Longitudinal section of fertile flower. —D. Fertile flower. —E. Sterile flower. —F. Infructescence. —G. Seed. Bars = 1 cm in A, B, F; 1 mm in C, D, E; 2.5 mm in G.

obtuse, centrally veined, ciliate, cream-white; petals 5, distinct, 1.5–2.5 mm long, lanceolate, membranous, 1-nerved, glabrous, cream-colored; staminodia 10, 1–1.5 cm long, white, filamentous.

Perfect flowers with a perianth like that of the sterile flowers but larger, calyx 1–1.5 mm long, petals 2–3 × 0.7–1 mm; stamens 10, the filaments exerted 5–6 mm beyond the petals, anthers ovate-

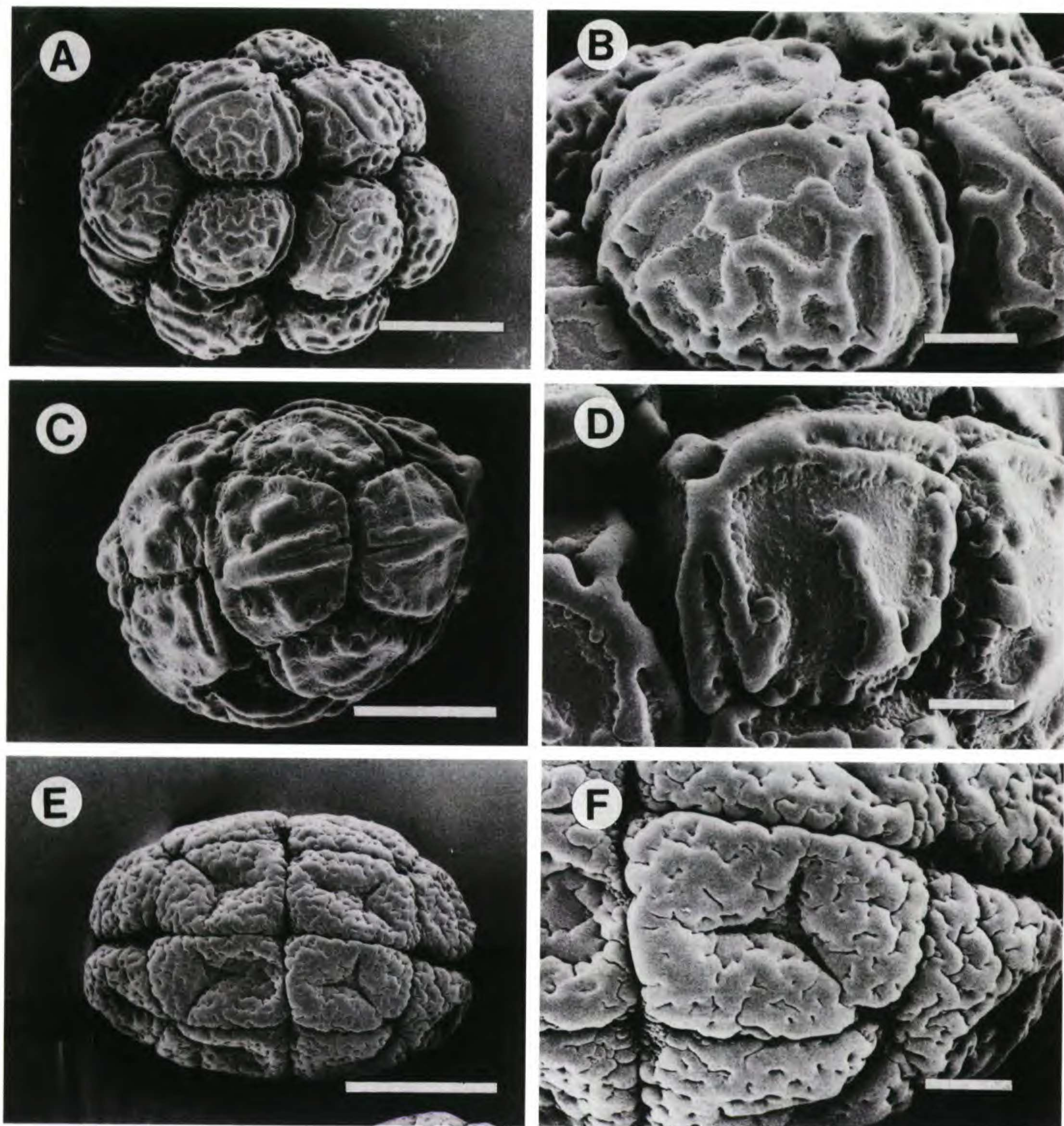


Figure 2. —A. Polyad of *Gagnebina bakoliae*. —B. Single grain from polyad of *G. bakoliae*. —C. Polyad of *G. bernieriana*. —D. Single grain from polyad of *G. bernieriana*. —E. Polyad of *G. myriophylla*. —F. Single grain from polyad of *G. myriophylla*. Bars = 20 μm in A, C, E; 5 μm in B, D, F.

sagittate, nearly basifixed, eglandular, light yellow; ovary 1–1.5 mm long, sessile or short-stipitate, densely white-pilose, style 6–7 mm long, stigma porate. Pods 1 to 4 per peduncle, sessile, 5–10 \times 0.7–1.2 cm, woody, lanceolate, acute at both ends, each valve 1.5–2 mm thick, the sutural ribs 1.5–2 mm wide, the replum 6–8 mm wide at the center, sunken between the ribs and often splitting diagonally over the seeds on old pods; seeds 6 to 12 per pod, obliquely inserted, 7–9 \times 5–6 mm, ovate-rhomboidal, castaneous, pleurogram nearly complete, endosperm thin.

Distribution. Northern Madagascar, Ankarana, in dry deciduous woodland and riverine forests, usually bordering streams, on limestone outcrops and rocky soils, 90–220 m.

Phenology. Flowering November, fruiting March.

Common names. Hazomburona, Famoha; wood used for building houses.

This species is named in honor of our friend and colleague at the University of Antananarivo, Bakolimalala Rakouth. *Gagnebina bakoliae* is intermediate in some characters between *G. bernieriana*

and *G. myriophylla* (Baker) G. P. Lewis & Guinet. The new species and *G. bernieriana* have both been grown from seed in the greenhouses at Cornell, and they are found to differ consistently in the following characteristics. The pinnae of *G. bernieriana* are strongly accrescent, with the distal pair 3–4 times as long as the proximal pair. In contrast, the distal pinnae of *Gagnebina bakoliae* are decrescent (Fig. 1). The petiole and rachis of *G. bakoliae* are densely tomentose adaxially but nearly glabrous abaxially, whereas the petiole and rachis of *G. bernieriana* are pubescent (but not usually tomentose) throughout. Although pod sizes overlap in their overall ranges, pods of *G. bakoliae* are on average larger than those of *G. bernieriana* (7–10 cm vs. 5–7 cm, respectively). The seeds of *G. bakoliae* are also larger (7–9 mm vs. 5–6 mm). The apex of the valves of *G. bakoliae* is often nearly symmetrically acute, while that of *G. bernieriana* is strongly asymmetrical. The fruits also differ in color: those of *G. bakoliae* are a deep chocolate-brown; those of *G. bernieriana* a lighter golden-brown. Although flowers and inflorescences of the two species are very similar, the anthers of *G. bernieriana* are oblong-sagittate whereas those of *G. bakoliae* are ovate-sagittate.

Gagnebina bakoliae can also be confused with *G. myriophylla*, especially in fruiting condition. *Gagnebina myriophylla* is known only from northwestern Madagascar in the Sambirano region. The anthers of this species are linear and bear a terminal apiculus. The fruits are very similar to those of *G. bakoliae*, but are somewhat smaller (4–6 cm long) and thicker.

Because Lewis and Guinet (1986) had found pollen to be a useful character in *Gagnebina*, we examined several pollen samples from the three species using scanning electron microscopy (Fig. 2). The pollen of *G. bakoliae* is usually in 16-celled polyads, although occasionally 12 to 20 grains per polyad were observed (Fig. 2a). The exine is coarsely reticulate and tricolporate (Fig. 2b). It is most similar to that of *G. bernieriana*, which also has a 16-celled polyad but a more irregularly reticulate exine and colpi either obscure or non-polar (Fig. 2c, d). The pollen of *G. myriophylla* (Fig. 2e, f) is quite different, with rugulate exine and vestigial central syncolpi.

Paratypes. MADAGASCAR. **Antsiranana:** Besaboba, near Ankarana, on Rte. 6, 13 Mar. 1993, M. Luckow 4225 (BH, K); Ankarana Special Reserve, 14 Mar. 1993, M. Luckow 4231 (BH, K).

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